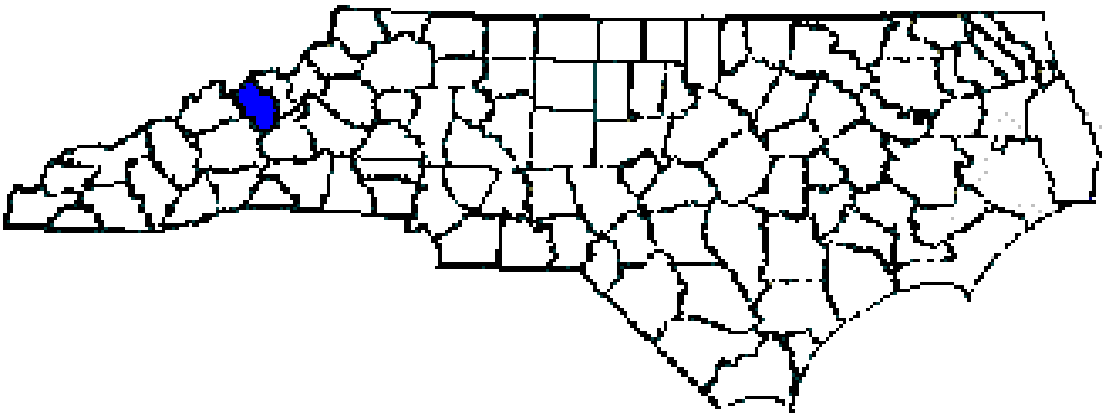
ANNUAL REPORT FOR 2015



Bald Creek Site #8 Mitigation Site
Yancey County
TIP No. R-2518B
COE Action ID: SAW-2007-2197-357/300
DWR #: 20071134

Prepared By:
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North Carolina Department of Transportation
November 2015

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SUMMARY

The following report summarizes the stream monitoring activities that have occurred during the Year 2015 at the Bald Creek Site #8 Mitigation Site in Yancey County. The North Carolina Department of Transportation (NCDOT) completed this project in August 2009. This report provides the monitoring results for the sixth formal year of monitoring (Year 2015). The Year 2015 monitoring period was the sixth of five scheduled years of monitoring on the Bald Creek Site #8 Mitigation Site (See Success Criteria Section 2.1).

Based on the overall conclusions of monitoring at Bald Creek Site #8, it has met the required monitoring protocols for the sixth formal year of monitoring on the stream and fourth formal year of monitoring on the planted vegetation. It was agreed by the Regulatory Agencies and NCDOT during the March 25, 2014 Annual Monitoring Meeting that the longitudinal profile could be discontinued for the remainder of the five year monitoring period due to heavy vegetation within the channel. Also, it was agreed by the Regulatory Agencies and NCDOT during the March 18, 2015 Annual Monitoring Meeting to discontinue all stream surveying, except for, Cross Section #5 and the longitudinal profile from Sta. 812+05 to 900 due to some bank instability in this area. In lieu of doing the entire stream survey, visual inspection of the channel stability throughout the reach, survey of Cross Section #5 and longitudinal profile from Sta. 812+05 to 900 and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the monitoring period. The channel is stable throughout, except for, the right bank just downstream of Cross Section #5 which is eroding. NCDOT plans to repair this bank in 2016. The streambank and buffer area were planted in March 2012 with live stakes and bareroot seedlings. The planted vegetation is surviving at this time.

NCDOT proposes to continue stream and vegetation monitoring at the Bald Creek Site #8 Mitigation Site in 2016.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the stream monitoring activities that have occurred during the Year 2015 at the Bald Creek Site #8 Mitigation Site. Site #8 is located on US 19 in Yancey County at Sta. 175+65 to Sta. 178+50 -L- (Figure 1). The Bald Creek Site #8 was constructed to provide mitigation for stream impacts associated with Transportation Improvement Program (TIP) number R-2518B in Yancey County.

The mitigation site provided approximately 997 linear feet of stream enhancement. Construction was completed during August 2009 by the NCDOT. Stream enhancement involved excavation of bankfull benches and installation of in-stream structures. In-stream structures, such as J-hooks and cross vanes were used to stabilize channel pattern and improve bed form diversity and habitat. The riparian buffer zone will also be planted.

1.2 Purpose

In order for a mitigation site to be considered successful, the site must meet the success criteria. This report details the monitoring in 2015 at the Bald Creek Site #8 Mitigation Site. Hydrologic monitoring was not required for this site.

1.3 Project History

August 2009	Construction Completed
October 2009	As-Built Survey Completed
February 2010	Site Planted (Type I only)
November 2010	Stream Channel Monitoring (Year 1)
November 2011	Stream Channel Monitoring (Year 2)
March 2012	Site Planted (Type I and II)
September 2012	Vegetation Monitoring (Year 1)
November 2012	Stream Channel Monitoring (Year 3)
February 2013	Planted Buffer from Sta. 10+00 to 11+00 RT.
March 2013	Bankfull Monitoring Gauge Installed
August 2013	Vegetation Monitoring (Year 2)
November 2013	Stream Channel Monitoring (Year 4)
July 2014	Vegetation Monitoring (Year 3)
November 2014	Stream Channel Monitoring (Year 5)
July 2015	Vegetation Monitoring (Year 4)
November 2015	Stream Channel Monitoring (Year 6)

1.4 Debit Ledger

The entire Bald Creek Site #8 stream mitigation site was used for the R-2518B project to compensate for unavoidable stream impacts.

Figure 1. Vicinity Map

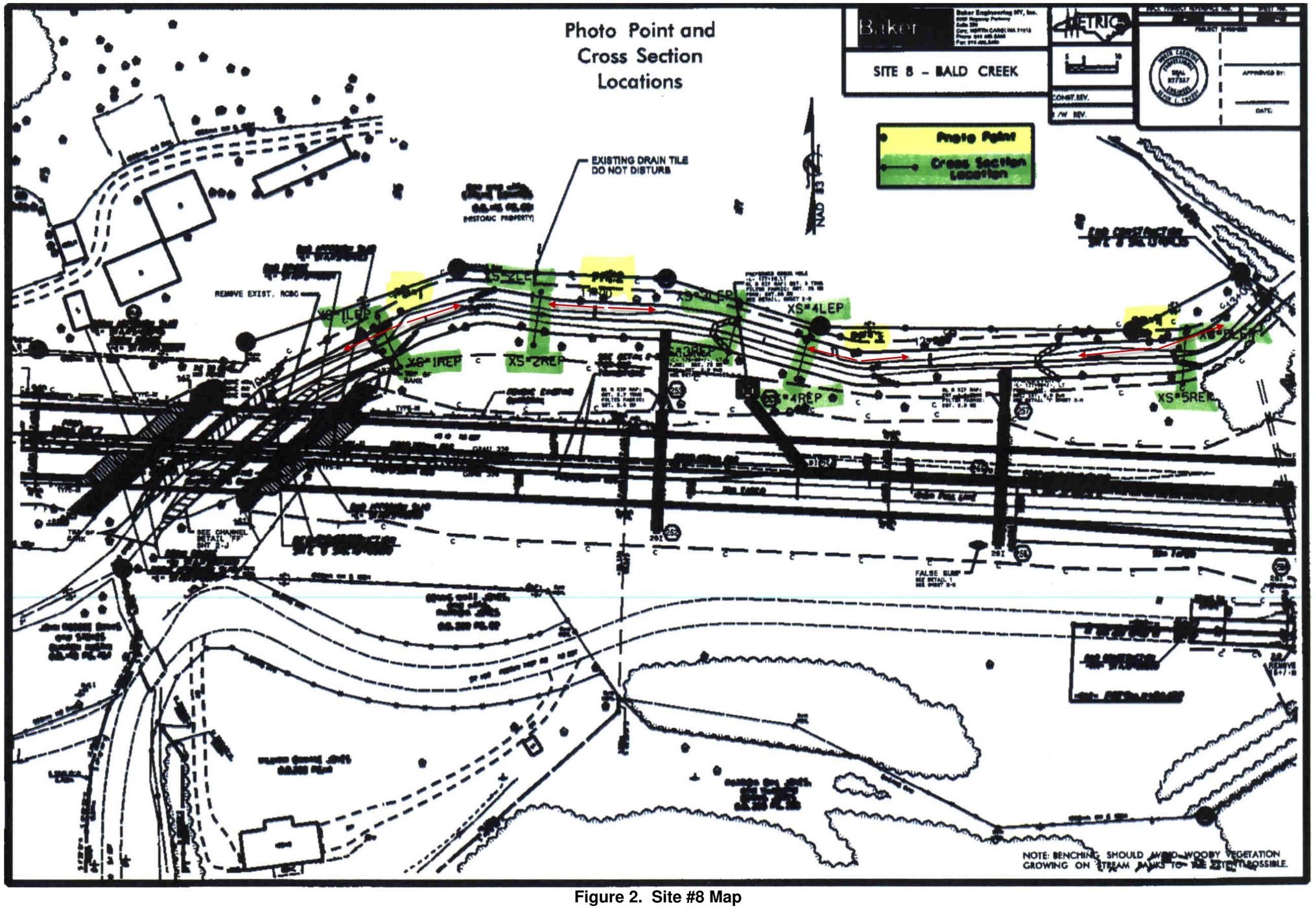


Figure 2. Site #8 Map

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2518B	RF-7
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STREAMBANK REFORESTATION FOR SITE 8

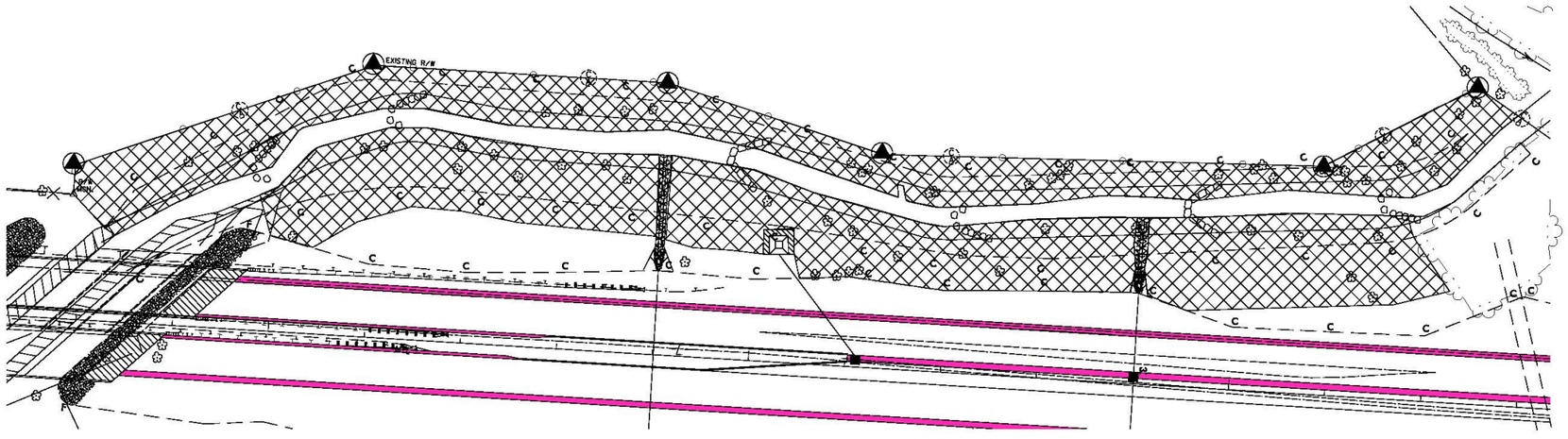


Figure 3. Site #8 Reforestation Plan

2.0 STREAM ASSESSMENT

2.1 Success Criteria

The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," dated April 2003 with the following exceptions:

1. Pebble counts shall not be conducted.

2. Two cross sections shall be conducted for streams less than 500 linear feet and five (5) cross sections shall be conducted for streams greater than 500 linear feet.

3. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

The permittee shall monitor the preservation sites by visual inspection. Photos will be taken and comments noted on plant survival. The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWR in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWR to schedule a site visit to "close out" the mitigation site.

2.2 Stream Description

2.2.1 Post-Construction Conditions

The enhancement of Bald Creek Site #8 Mitigation Site involved excavation of bankfull benches and installation of in-stream structures. In-stream structures, such as J-hooks and cross vanes were used to stabilize channel pattern and improve bed form diversity and habitat. The riparian buffer zone will also be planted.

2.2.2 Monitoring Conditions

The objective of the Bald Creek Site #8 stream enhancement was to enhance a E4 stream as identified in Rosgen's Applied River Morphology. A total of five cross sections (two in a riffle and three in a pool) were surveyed. For this report, only cross sections containing riffles were used in the comparison of channel morphology. Morphology table comparison can be found in the 2010 to 2014 monitoring reports.

2.3 Results of the Stream Assessment

2.3.1 Site Data

The assessment included the survey of five cross sections and the longitudinal profile of Bald Creek Site #8 established by NCDOT after construction.

The length of the profile along Bald Creek Site #8 was approximately 900 linear feet. Five cross sections were established during the as-built monitoring year. Cross section locations were subsequently based on the stationing of the longitudinal profile and are presented below. The location of the cross sections 1 through 4 and longitudinal profile are shown in the 2010 to 2014 monitoring reports. Cross Section #5 and longitudinal profile from Sta. 812+05 to 900 can still be seen in Appendix A.

Bald Creek Site #8 Cross-Sections:

- Cross-Section #1: Bald Creek Site #8, Station 23+00, midpoint of pool
- Cross-Section #2: Bald Creek Site #8, Station 177+00, midpoint of riffle
- Cross-Section #3: Bald Creek Site #8, Station 366+00, midpoint of pool
- Cross-Section #4: Bald Creek Site #8, Station 438+06, midpoint of riffle
- Cross-Section #5: Bald Creek Site #8, Station 812+05, midpoint of pool

Based on comparisons of the As-Built to the monitoring data, all of the cross sections appear stable with little or no active bank erosion. Graph of the Cross Section #5 is presented in Appendix A. Future survey data will vary depending on actual location of rod placement and alignment; however, this information should remain similar in appearance.

It was agreed by the Regulatory Agencies and NCDOT during the March 25, 2014 Annual Monitoring Meeting that the longitudinal profile could be discontinued for the remainder of the five year monitoring period due to heavy vegetation within the channel. Also, it was agreed by the Regulatory Agencies and NCDOT during the March 18, 2015 Annual Monitoring Meeting to discontinue all stream surveying, except for, Cross Section #5 and the longitudinal profile from Sta. 812+05 to 900 due to some bank instability in this area.

In lieu of doing the entire stream survey, visual inspection of the channel stability throughout the reach, survey of Cross Section #5 and longitudinal profile from Sta. 812+05 to 900 and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the monitoring period. The channel is stable throughout, except for, the right bank just downstream of Cross Section #5 which is eroding. NCDOT plans to repair this bank in 2016. Pebble counts were not required per the permit conditions and therefore were not completed. Multiple bankfull events were documented by a surface water gauge at Site 8 during the 2013 and 2014 monitoring years.

3.0 VEGETATION: BALD CREEK SITE #8

3.1 Description of Species

The following tree species were planted on the streambank:

Salix nigra, Black Willow

Cornus amomum, Silky Dogwood

The following tree species were planted in the buffer area:

Liriodendron tulipifera, Yellow Poplar

Platanus occidentalis, Sycamore

Fraxinus pennsylvanica, Green Ash

Quercus alba, White Oak

3.2 Results of Vegetation Monitoring

Streambank & Buffer Vegetation: The streambank reforestation was completed in March 2012. The Year 4 vegetation monitoring evaluation noted: Type I: Black Willow, Silky Dogwood and Type II: Sycamore, Green Ash, Tulip Poplar and White Oak were surviving at the time of the monitoring evaluation.

3.3 Conclusions

NCDOT will continue to monitor the planted vegetation in 2016.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The Bald Creek Site #8 Mitigation Site has met the required monitoring protocols for the sixth formal year of monitoring on the stream and the fourth formal year of monitoring on the planted vegetation. The channel is stable throughout, except for, the right bank just downstream of Cross Section #5 which is eroding. NCDOT plans to repair this bank in 2016. The planted vegetation is surviving at this time.

NCDOT proposes to continue stream and vegetation monitoring at the Bald Creek Site #8 Mitigation Site in 2016.

5.0 REFERENCES

Stream Mitigation Plan, US Highway 19, R-2518B On-Site Mitigation Yancey County, North Carolina, February 2007.

Stream Mitigation Plan Sheets for R-2518B, US 19 from east of the Madison County line to SR 1336, Stream Mitigation (Preservation, Enhancement, and Restoration), Buck Engineering.

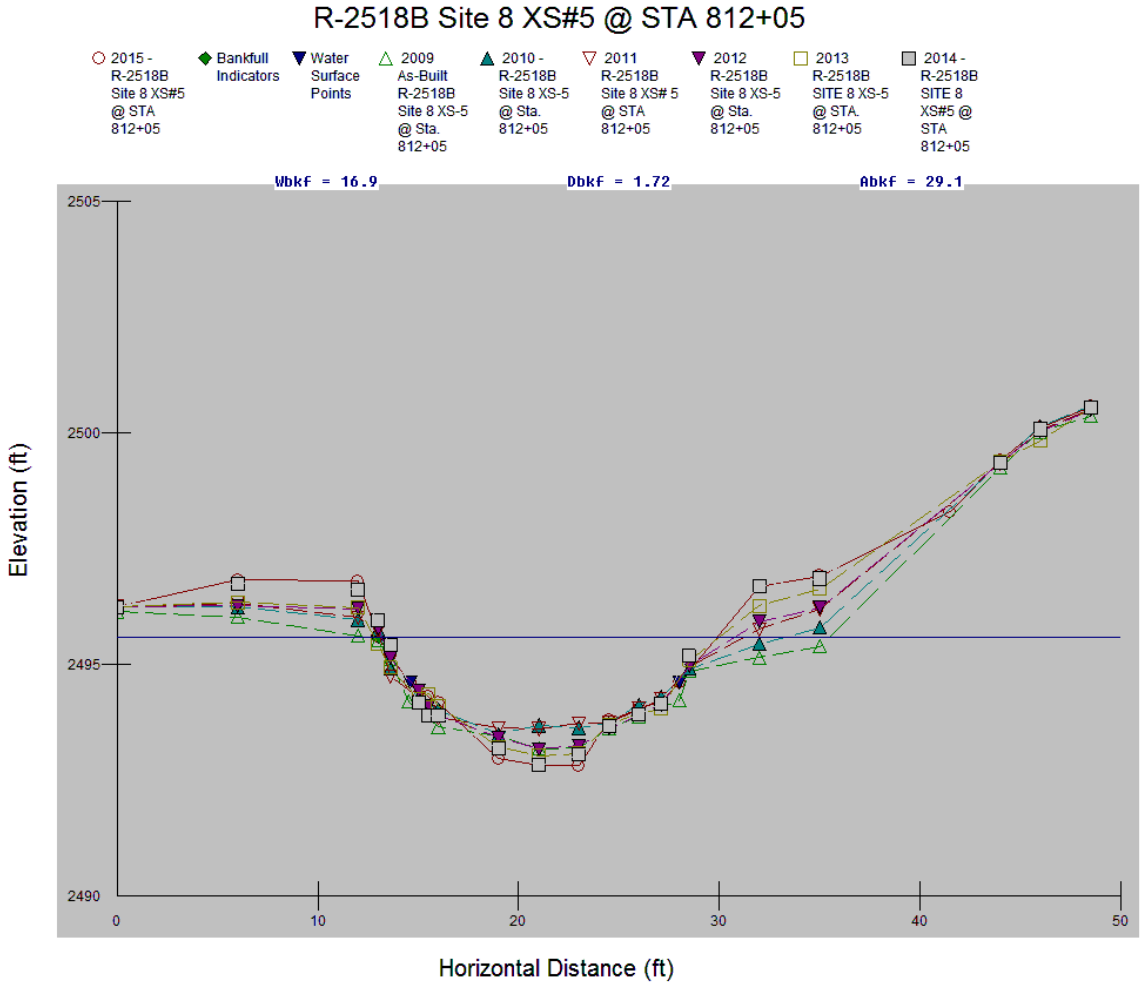
North Carolina Department of Transportation (NCDOT), April 29, 2008. 404 and 401 Individual Permits for R-2518A and R-2518B (ACOE Permit No. 2007-2197-357/300 and DWR Project No. 20071134, Individual Certification No. 3706).

Rosgen, D.L, 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

US Army Corps of Engineers (USACE), 2003. Stream Mitigation Guidelines. Prepared with cooperation from the US Environmental Protection Agency, NC Wildlife Resources Commission, and the NC Division of Water Quality.

APPENDIX A

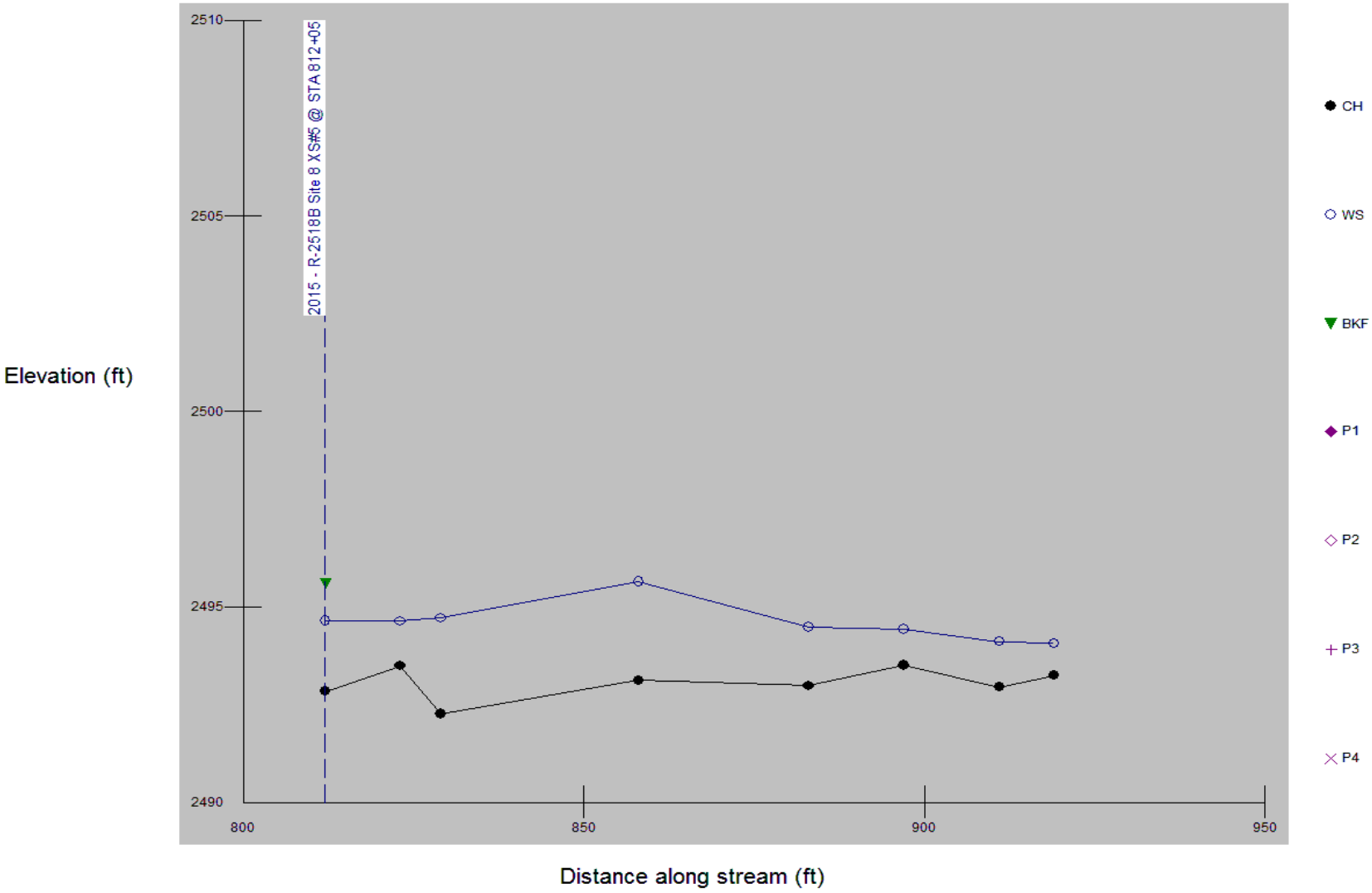
CROSS SECTION AND LONGITUDINAL PROFILE



Site #8: Cross-Section #5 (Pool) Abbreviated Morphological Summary*						
	2010	2011	2012	2013	2014	2015
Bankfull Cross Sectional Area (ft^2)	29.34	28.13	31.18	25.67	34.43	29.13
Maximum Bankfull Depth (ft.)	2.25	2.11	2.62	2.41	3.11	2.78
Bankfull Mean Depth (ft.)	1.36	1.49	1.69	1.55	2	1.72
Bankfull Width (ft.)	21.57	18.82	18.48	16.54	17.25	16.91

* According to the Rosgen Classification of Natural Rivers floodprone width, entrenchment ratio, and width depth ratio are not measured in pool, glide, or run features.

2015 R-2518B Site 8 Profile



APPENDIX B

SITE PHOTOGRAPHS

Bald Creek Site #8

Photo Point #1 (Upstream)

Photo Point #1 (Downstream)

Photo Point #2 (Upstream)

Photo Point #2 (Downstream)

Photo Point #3 (Upstream)

Photo Point #3 (Downstream)

November 2015

Bald Creek Site #8

Photo Point #4 (Upstream)

Photo Point #4 (Downstream)

Right bank eroding downstream of Cross Section #5
November 2015

Bald Creek Site #8

Vegetation Overview Photo

Vegetation Overview Photo

Vegetation Overview Photo

July 2015